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Experiment Station

PARAFORMALDEHYDE PELLET NOT NECESSARY IN VACUUM-PUMPED MAPLE SAP SYSTEM

Abstract. In a study of sugar maple sap collection through a vacuum-pumped plastic tubing system, yields were compared between tapholes in which paraformaldehyde pellets were used and tapholes without pellets. Use of the pellets did not increase yield.

Since the spring of 1967 our Sugar Maple Sap Production Project at Burlington, Vermont, has been conducting research on the use of vacuum pumping to collect sap yields from sugar maple trees (*Acer saccharum* Marsh.). In an earlier study Blum *(1967)* found that increased sap yields from closed tubing systems on sloping land were associated with a naturally produced vacuum. Subsequent research with applied vacuum by Blum and Koelling *(1968)* showed yield increases as high as 300 percent. On flat land, sap yield increases were doubled with vacuum pumping *(Morrow and Gibbs 1969)*.

Many sugarmakers put a paraformaldehyde pellet into each taphole. This aspirin-size pellet is used as a means of increasing sap yields. A number of sugarmakers and researchers have noticed that, when vacuum pumping is used, pieces of the pellets get into the tubing. Thus, since the pellet does not always remain in the taphole, there is a serious question about the effectiveness of the pellet under these circumstances.

From a study completed during the 1969 sap season, we found that a paraformaldehyde pellet was not necessary when a vacuum pump is used to pump sap from sugar maple tapholes.

Methods

This study was made in northwestern Vermont to determine if the amount of sap collected from tapholes with paraformaldehyde pellets (fig. 1) was different from the amount of sap collected from tapholes without pellets. All sap yields were collected from a closed plastic-tubing installation, with a vacuum pump.

Figure 1.—Putting a paraformaldehyde pellet into a taphole. The pellet is pushed to the back of the taphole.

A total of 16 sugar maple trees, 20 to 30 inches in diameter, were used in this study. Two tapholes, 6 inches apart, were drilled into each sugar maple tree to a wood depth of 3 inches, excluding bark. A 250-milligram paraformaldehyde pellet was placed in one of the two tapholes at random. Spouts and plastic tubing were installed, and the sap yields from each taphole were collected in individual 55-gallon sealed drums.

A Venturi ½-horsepower jet-type vacuum pump was used to pump the sap from the trees (fig. 2). This pump provided a vacuum of 12 to 13 inches of mercury at each taphole.

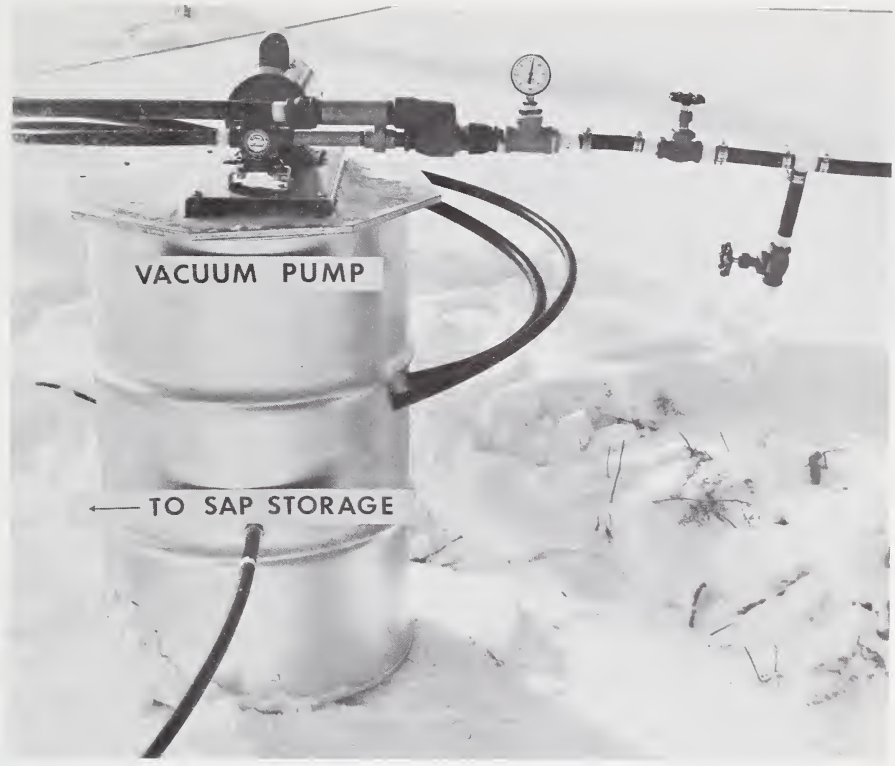

Figure 2.—A vacuum pump used to provide vacuum at the tapholes.

Results

On the average, a taphole without a pellet produced 5.2 liters more sap than one with a pellet (table 1). This increase was statistically significant, with a probability of less than 5 percent that this difference in sap yield was a chance occurrence.

We do not know why we got less sap from the tapholes with pellets. There is a possibility that the pellet, under the stress of vacuum, becomes lodged in the spout and impedes sap flow. Also, as the pellet disintegrates, it may leave the taphole and restrict flow in the tubing lines. When the spouts were removed from the trees, we did not observe any pellet fragments on the inside ends of the spouts. Pellet fragments have been observed in the tubing lines of this and other studies where high vacuum was applied.

We conclude from the results of this study that the paraformaldehyde pellet is not necessary when 12 inches of applied vacuum is used with a tubing installation.

Table 1.—*Sugar maple sap yields collected under applied vacuum from tapholes with and without pellets*

Tree number	Taphole treatment	
	Pellet	No pellet
	Liters	*Liters*
1	24	46
2	24	23
3	44	38
4	27	29
5	28	35
6	22	27
7	10	20
8	46	44
9	44	42
10	33	37
11	6	15
12	30	44
13	44	45
14	67	55
15	4	29
16	48	56
Total	501	585

t-value = 2.20; $t_{05,15df} = 2.13$

Literature Cited

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